



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,844	04/17/2001	Kyle M. Hanson	291958112US1	6731

25096 7590 06/16/2003

PERKINS COIE LLP
PATENT-SEA
P.O. BOX 1247
SEATTLE, WA 98111-1247

EXAMINER

MUTSCHLER, BRIAN L

ART UNIT	PAPER NUMBER
----------	--------------

1753

DATE MAILED: 06/16/2003

1812

Please find below and/or attached an Office communication concerning this application or proceeding.

18-12

Office Action Summary

Application No.

09/836,844

Applicant(s)

HANSON ET AL.

Examiner

Brian L. Mutschler

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7 and 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:
 - a. On page 11 at line 4, please change "assembly 85" to --assembly 95--.
 - b. On page 20 at line 1, please change "trying" to --drying--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 27, 28 and 30-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 27 recites the limitations "the initial spray processing position" and "the secondary spray processing position" in lines 4-5. There is insufficient antecedent basis for these limitations in the claim. Furthermore, the limitations are indefinite because only a single spray processing position was introduced in claim 20. It is suggested that these limitations be changed to --the immersion processing position-- and --the spray processing position--, which are supported by the independent claim. The same limitations also appear in claim 28.

Claim 30 recites the limitation "a second chemical delivery system" in line 17. This limitation is indefinite because a *first* chemical delivery system is not recited in the

claim. The use of the term "second" implies that a first system is also present. It is suggested that the phrase be changed to --a chemical delivery system--. The phrase also occurs in lines 23, 25-26 and 29-30. The same applies to dependent claims 31-36. It is noted that claims 32 and 34 recite the limitation "the chemical delivery system".

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Reid et al. (U.S. Pat. No. 6,099,702).

Regarding claims 1, 11, 20, 30, 37 and 38, Reid et al. disclose an electroplating chamber for plating semiconductor wafers comprising:

- a) A workpiece support **190**. The workpiece support **190** is adapted to hold a wafer **W** and is also adapted to provide electroplating power to the workpiece (fig. 1; col. 3, lines 9-11).

- b) A processing container **110**. The plating cell comprises an inner processing container **110**, which is contained within an outer container having walls **132** (fig. 1).
- c) A drive mechanism **170**. The drive mechanism **170** is an actuator capable of moving the support **190** in a vertical direction through a plurality of different positions (fig. 1; col. 3, lines 9-16).
- d) A first chemical delivery system. The first chemical delivery system comprises a pump **122** and an inlet **118** for supplying the electroplating solution to the cell (fig. 1; col. 2, lines 38-48).
- e) A first chemical collector system. Walls **112** and **132** form a channel surrounding the processing chamber **110** to reclaim excess solution **S** (fig. 1; col. 2, lines 56-67).
- f) A second chemical delivery system. The second chemical delivery system comprises a nozzle **160** to deliver a spray of a second solution to the wafer **W** (fig. 1; col. 3, lines 25-40).
- g) A second chemical collector system. The second chemical collector system comprises channel **140** to collect waste from the second chemical delivery system (fig. 1; col. 3, lines 41-55).
- h) A control system **198**. The drive mechanism **170** is controlled by controller **198** to move between the different processing positions (fig. 1; col. 3, lines 9-16).

Regarding claims 2, 5, 17, 18, 22, 24 and 31, Reid et al. disclose that the wafer support **190** and wafer **W** are spun (col. 3, lines 25-26). During spinning at position **3**, the solution is flung into the channel **140** (col. 3, lines 41-55).

Regarding claims 3, 4, 21 and 23, Reid et al. disclose that plating is performed at a first position, position **1**, and rinsed with a solution from nozzle **160** at positions **2** and **3** located above position **1** (fig. 1; col. 3, lines 17-55). As taught by Reid et al., rinsing with a spray solution from nozzle **160** can occur in different positions, i.e., positions **2** and **3** (col. 3, lines 25-55).

Regarding claims 6, 9, 16, 19, 25, 29 and 32, the second chemical collection system comprising channel **140** has two walls **132** and **142**, corresponding to the "splash wall" and "further wall" recited in the instant claims, that form the channel **140** (fig. 1).

Regarding claims 7, 26 and 33, an outlet **146** drains the excess waste from the collection channel **140** (fig. 1; col. 3, lines 1-8).

Regarding claims 8 and 34, the control system **198** directs the drive mechanism **170** to different positions (fig. 1; col. 3, lines 9-16).

Regarding claim 10, the second chemical delivery system, nozzle **160**, is capable of delivering a stream of processing fluid to a fixed location. Reid et al. disclose that the nozzle **160** is "directed" (col. 4, lines 10-19).

Regarding claims 12, 13, 27, 28, 35 and 36, the actuator **170** is capable of moving the support **190** in a vertical direction (fig. 1; col. 3, lines 9-16). The support **190** can also be rotated (spun) relative to the container **110** (col. 3, lines 25-55).

Regarding claims 14 and 15, the device of Reid et al. comprises two chemical delivery systems, i.e., nozzle **160** and pump **122**/inlet **118**, and two chemical collector systems, i.e., channels **130** and **140** (fig. 1; col. 2, line 38 to col. 3, line 55).

Since Reid et al. teach all of the structural limitations recited in the instant claims, the reference is deemed to be anticipatory. It is noted that the instant claims recite many process limitations, e.g., "the second chemical collector systems collects spent processing fluids as the spent processing fluid is flung from the microelectronic workpiece during spinning" (claim 5). The apparatus of Reid et al. is deemed capable of performing the recited intended uses of the apparatus and thus anticipates the claims.

6. Claims 1-19, 37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Adams et al. (U.S. Pat. No. 3,950,184).

Regarding claims 1, 11, 37 and 38, Adams et al. disclose an chamber for processing semiconductor wafers comprising:

- a) A workpiece support **10**. The workpiece support **10** is adapted to hold a wafer **12** and is also adapted to provide electroplating power to the workpiece (figs. 1, 3 and 4).
- b) A processing container **24** (fig. 1).
- c) A drive mechanism **18**. The drive mechanism **18** is an elevator apparatus capable of moving the support **10** in a vertical direction through a plurality of different positions (figs. 1, 3 and 4; col. 2, lines 34-39).

- d) A first chemical delivery system. The first chemical delivery system comprises a conduit **90** to deliver a solution to the cell (fig. 1; col. 3, lines 65-67).
- e) A first chemical collector system. The first chemical collector system comprises an outlet **36** (fig. 1).
- f) A second chemical delivery system. The second chemical delivery system comprises a conduit **92** for delivering a second solution to the wafer **12** (fig. 1; col. 3, lines 65-67).
- g) A second chemical collector system. The second chemical collector system comprises an outlet **32** (fig. 1).
- h) A control system. The drive mechanism **18** is controlled by the rotation of a cam **80** (fig. 2; col. 3, line 42 to col. 5, line 38).

Regarding claims 2, 5, 17 and 18, Adams et al. disclose that the wafer support **10** and wafer **12** are spun (col. 2, lines 48-58). During spinning, the solution is flung into the collection system (col. 4, lines 39-49).

Regarding claims 3 and 4, Adams et al. disclose that processing is performed at various positions, where the second position (figure 3) is above the third position (figure 4) (col. 2, lines 34-39).

Regarding claims 6, 9, 16 and 19, the second chemical collection system has two walls as shown in the figures, corresponding to the "splash wall" and "further wall" recited in the instant claims, that form a channel **23** (fig. 1).

Regarding claim 7, an outlet **32** drains the excess waste from the collection channel **23** (fig. 1).

Regarding claim 8, the control system with cam **80** directs the drive mechanism **18** to different positions (fig. 1, 3 and 4; col. 3, line 42 to col. 5, line 38).

Regarding claim 10, the second chemical delivery system is capable of delivering a stream of processing fluid to a fixed location (fig. 1, 3 and 4).

Regarding claims 12 and 13, the drive mechanism is capable of moving the support **10** in a vertical direction and rotating the support (spun) relative to the container **24** (col. 2, lines 34-39 and lines 48-58).

Regarding claims 14 and 15, the device of Adams et al. comprises two chemical delivery systems, i.e., conduits **90** and **92**, and two chemical collector systems, i.e., channels **23** and **25** (fig. 1).

Since Adams et al. teach all of the structural limitations recited in the instant claims, the reference is deemed to be anticipatory. It is noted that the instant claims recite many process limitations, e.g., "the second chemical collector systems collects spent processing fluids as the spent processing fluid is flung from the microelectronic workpiece during spinning" (claim 5). The apparatus of Adams et al. is deemed capable of performing the recited intended uses of the apparatus and thus anticipates the claims.

7. Claim 37 is rejected under 35 U.S.C. 102(e) as being anticipated by Dordi et al. (U.S. Pat. No. 6,416,647).

Dordi et al. disclose an apparatus for processing a semiconductor workpiece comprising:

- a) A workpiece support **204** (fig. 2).
- b) A processing container **100** (fig. 2).
- c) A drive mechanism. The drive mechanism comprises an actuator **346** that is capable of moving the workpiece to a plurality of locations (col. 16, lines 21-23).
- d) A plurality of chemical delivery systems. The apparatus has means to provide an electroplating solution and a rinsing solution to the workpiece (col. 15, lines 12-25; col. 16, lines 7-20).
- e) A plurality of chemical collector systems. The plurality of chemical collector systems comprises outlets **258** and **259** (fig. 2).

Since Dordi et al. teach all of the structural limitations recited in the instant claim, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-5, 8, 10, 20, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dordi et al. (U.S. Pat. No. 6,416,647).

Regarding claims 1 and 20, Dordi et al. disclose an electroplating apparatus for processing semiconductor wafers comprising:

- a) A workpiece support **204** (fig. 2).
- b) A processing container **100** (fig. 2).
- c) A drive mechanism. The drive mechanism comprises an actuator **346** that is capable of moving the workpiece to a plurality of locations (col. 16, lines 21-23).
- d) A plurality of chemical delivery systems. The apparatus has means to provide an electroplating solution and a rinsing solution to the workpiece (col. 15, lines 12-25; col. 16, lines 7-20). One chemical delivery system comprises spouts **260** to spray the rinsing solution (col. 16, lines 7-10).
- e) A plurality of chemical collector systems. The plurality of chemical collector systems comprises outlets **258** and **259** (fig. 2).

Regarding claims 2, 5, 22 and 24, the substrate support member **204** is capable of spinning to dry the workpiece, i.e., removing the solution (col. 16, lines 15-20).

Regarding claims 3 and 4, the position for plating the wafer is located vertically above the position for rinsing the wafer (col. 16, lines 7-8).

Regarding claim 10, the spouts **260** are capable of delivering a stream to a fixed position.

The apparatus of Dordi et al. differs from the instant invention because Dordi et al. do not disclose a control system to direct the drive mechanism, as recited in claims 1, 8 and 20.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Dordi et al. to use a control system to direct the drive mechanism because providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art (see *In re Venner*, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958)).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references disclose apparatuses capable of *in situ* processing using two or more different processing solutions without mixing the different solutions:

U.S. Pat. No. 5,169,408 Biggerstaff et al.

U.S. Pat. No. 5,871,584 Tateyama et al.

U.S. Pat. No. 6,214,193 Reid et al.

U.S. Pat. No. 6,352,623 Volodarsky et al.

US 2003/0079989 A1 Klocke et al.

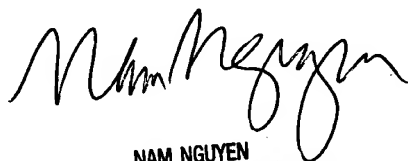
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Mutschler whose telephone number is (703) 305-0180. The examiner can normally be reached on Monday-Friday from 8:00am to 4:30pm.

Art Unit: 1753

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (703) 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

blm
June 10, 2003



NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700